



ECC Decision (12)03

The harmonised conditions for UWB applications
onboard aircraft

Approved 02 November 2012

EXPLANATORY MEMORANDUM

1 INTRODUCTION

Use of radio links for communications purposes onboard an aircraft is an emerging field. Motivated by the ever increasing demand for lighter and more efficient aircraft as well as the demand for the introduction of wireless communications capabilities for passengers and crew, the use of ultra-wideband (UWB) radio technology onboard aircraft is seen as a promising technological option for replacing wires and creating new and innovative applications. In particular applications such as enhanced wireless passenger communications and entertainment, non-safety wireless crew communications as well as non-safety wireless control and monitoring functions are candidates for the initial use of UWB technology.

ECC/DEC/(06)04 for UWB technology below 10.6 GHz excludes devices installed in flying models, aircraft and other aviation. This ECC Decision defines the conditions relating to the harmonised introduction of UWB applications onboard aircraft in identified frequency bands.

This decision only covers the radio regulatory aspects of operation of such systems, not the aviation safety aspects (both technical and human factors related) that are in the responsibility of the relevant aviation authorities.

2 BACKGROUND

ECC received ETSI TR 102 834 describing the use of UWB applications onboard aircraft and conducted a co-existence study considering UWB applications onboard aircraft and existing radio services in the frequency bands from 3.1 GHz to 4.8 GHz and from 6.0 GHz to 8.5 GHz.

An agreed regulatory approach is required to ensure that the spectrum utilised by UWB applications onboard aircraft in identified frequency bands can be used in any national airspace that the aircraft is crossing, provided that the system conforms to agreed radio specification limits in order to prevent harmful interference.

3 REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands under specified conditions in CEPT member countries is laid down by law, regulation or administrative action. ECC Decisions are required to deal with the carriage and use of equipment throughout Europe. The ECC also recognises that for UWB applications onboard aircraft to be introduced successfully throughout Europe, confidence must be given on the one hand to manufacturers to make the necessary investments and on the other hand to users of existing services that their protection will be ensured.

The harmonisation on a European basis would support the *Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.*

A commitment by CEPT member countries to implement an ECC Decision will provide a clear indication that the required frequency range will be made available on time and on a Europe-wide basis and that the means to ensure protection of existing services will be applied.

ECC DECISION OF 02 NOVEMBER 2012 ON THE HARMONISED CONDITIONS FOR UWB APPLICATIONS ONBOARD AIRCRAFT (ECC/DEC/(12)03)

“The European Conference of Postal and Telecommunications Administrations,

considering

- a. that every state has sovereignty over the airspace, including the radio spectrum, above its territory;
- b. that for the purposes of this Decision the aircraft is considered under the sovereignty of the country of aircraft registration;
- c. that accordingly responsibility for the authorisation of the frequency spectrum utilised onboard an aircraft will be that of the country of registration of the aircraft;
- d. that the use of the relevant frequencies will be authorised by one administration but those frequencies could also be used within the airspace of other countries which also implemented this ECC Decision;
- e. that the installation of UWB equipment onboard aircraft is subject to aviation regulation, including airworthiness certification, by the relevant aviation authorities and the equipment cannot be put into operation until it complies with these regulations;
- f. that UWB technology shall mean technology for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a very large frequency range, which may overlap several frequency bands allocated to radiocommunication services;
- g. that this Decision is applicable to technologies with bandwidth significantly wider than 50 MHz;
- h. that Short Range Devices (SRD) using UWB technology may be used for wireless passenger communications and entertainment non-safety wireless crew communications as well as non-safety wireless control and monitoring functions;
- i. that harmonised conditions across CEPT/EU help to establish an effective single market for these applications, with consequent economies of scale and benefits to the flying public, and avoid difficulties in enforcing divergent national regulations;
- j. that devices using UWB technology operate on a non-interference, non-protected basis;
- k. that the issue of compatibility of UWB devices with other radio equipment including aeronautical communication and navigation equipment operated on board an aircraft is the responsibility of the relevant aviation authorities;
- l. that a co-existence study considering UWB applications onboard aircraft and existing radio services in the frequency bands from 3.1 GHz to 4.8 GHz and from 6.0 GHz to 8.5 GHz has been conducted by the ECC and that the results of these studies are contained in ECC Report 175;
- m. that the assumption used in ECC Report 175 is that not more than two UWB devices would be transmitting at any time within an aircraft within the same frequency range. In case the active number of UWB devices onboard an aircraft significantly exceeds this assumption used in ECC Report 175, then this regulation will have to be reviewed;
- n. that the Methanol line at 6.7 GHz discovered in 1991 is becoming a focus of radio-astronomical research;
- o. In EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the R&TTE Directive. Conformity with the essential requirements of the R&TTE Directive may be demonstrated by compliance with the applicable harmonised European standard(s) or by using the other conformity assessment procedures set forth in the R&TTE Directive.

DECIDES

1. that this ECC Decision defines general harmonised conditions for the use of devices using UWB technology onboard aircraft operating in the frequency band from 6 GHz to 8.5 GHz;
2. that, for the purpose of this Decision, the following definitions apply:
 - a) Maximum mean e.i.r.p. spectral density: the highest signal strength measured in any direction at any frequency within the defined range. The mean e.i.r.p. spectral density is measured with a 1 MHz resolution bandwidth, an RMS detector and an averaging time of 1 ms or less.
 - b) Maximum peak e.i.r.p.: the highest signal strength measured in any direction at any frequency within the defined range. The peak e.i.r.p. is defined within a 50 MHz bandwidth.
3. that the devices permitted under this ECC Decision are exempt from individual licensing and operate on a non-interference, non-protected basis;
4. that the technical requirements in the annex apply to devices permitted under this ECC Decision;
5. that this Decision enters into force on 02 November 2012;
6. that the preferred date for implementation of this Decision shall be 01 May 2013;
7. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented.”

Note:

Please check the Office documentation database <http://www.ecodocdb.dk> for the up to date position on the implementation of this and other ECC Decisions.

ANNEX

The following Table 1 shows technical requirements applicable to devices permitted under this ECC Decision:

Table 1: Maximum e.i.r.p. limits

Frequency range	Maximum mean e.i.r.p. spectral density	Maximum peak e.i.r.p. (defined in 50 MHz)	Requirements for mitigation techniques
Below 1.6 GHz	-90 dBm/MHz	-50 dBm	
1.6 to 2.7 GHz	-85 dBm/MHz	-45 dBm	
2.7 to 3.4 GHz	-70 dBm/MHz	-36 dBm	
3.4 to 3.8 GHz	-80 dBm/MHz	-40 dBm	
3.8 to 4.2 GHz	-70 dBm/MHz	-30 dBm	
4.2 to 4.8 GHz	-70 dBm/MHz	-30 dBm	
4.8 to 6 GHz	-70 dBm/MHz	-30 dBm	
6.0-6.650 GHz	-41.3 dBm/MHz	0 dBm	
6.650 -6.6752 GHz	-62.3 dBm/MHz	-21 dBm	notch of 21 dB should be implemented to meet a level -62.3 dBm/MHz ¹
6.6752-8.5 GHz	-41.3 dBm/MHz	0 dBm	7.25-7.75 GHz (FSS and MetSat (7.45-7.55 GHz) protection) ^{1, 2} 7.75-7.9 GHz (MetSat protection) ^{1,3}
8.5 to 10.6 GHz	-65 dBm/MHz	-25 dBm	
Above 10.6 GHz	-85 dBm/MHz	-45 dBm	

¹ Alternative mitigation techniques offering equivalent protection such as the use of shielded portholes could be a solution.

² 7.25-7.75 GHz (Fixed Satellite Service) and 7.45-7.55 GHz (Meteorological Satellite) protection: $-51.3 - 20 * \log_{10}(10 \text{ [km]} / x \text{ [km]})$ (dBm/MHz) for heights above ground above 1 000 m, where x is the aircraft height above ground in kilometres, -71.3 dBm/MHz for heights above ground of 1 000 m and below.

³ 7.75-7.9 GHz (Meteorological Satellite) protection: $-44.3 - 20 * \log_{10}(10 \text{ [km]} / x \text{ [km]})$ (dBm/MHz) for heights above ground above 1000 m, where x is the aircraft height above ground in kilometres, and -64.3 dBm/MHz for heights above ground of 1000 m and below.